TOP SECRET [redacted]

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FINAL REPORT

PRE-PROCESSED CUT-FILM

STUDY

MAY 1969

TOP SECRET

I. Introduction

This report describes the findings of the ad hoc "Chip Committee" which was asked by the Executive Director to determine the Center's film and film format needs for the [redacted] We have found that the use of pre-processed chips probably will not be necessary during the early seventies; we believe that the Center can effectively accomplish its mission with adequate copies of roll film. This is not to say, however, that certain efficiencies or advantages could not be realized through the introduction of some cut film later in the period. 25X1A

In assessing the advantages and disadvantages of the film configurations that the Center will need and should obtain to perform its photointerpretation mission during the early seventies, we examined three functions: exploitation; storage, retrieval, and distribution; and production and reproduction. The needs of the several components of the Center were determined in four ways: data collection and analysis; experimentation and analysis; measurement and the construction of a small planning model; and the most important, sifting and weighing the subjective expressions of those who have had many years of experience in the three functions mentioned above.

In carrying out our investigations, we proceeded from two basic assumptions:

a. There will be no major organizational changes in the Center solely to make use of pre-processed cut film or chips. Thus, we accepted the Center's present organization, facilities, equipment and responsibilities as continuing into the early seventies. 25X1

b. An adequate number of copies of [redacted] roll film can be made available to the Center to perform its mission read-out requirements and to service the post-mission requirements (after first- and second-phase exploitation) of IEG, TSSG, IAS, DIA and the other organizations that now rely to varying degrees on NPIC's film library. 25X1D

Although the majority of the members and observers of the "Chip Committee" (those from IEG, PSG and some from TSSG) fully concur in the findings of this report, others do not. Those few who do not fully concur believe that chips can provide significantly worthwhile advantages and that certain changes should be made in the Center's organizational structure and methods of operation to make use of these advantages. It must be noted that the controversy over the question of whether pre-processed chips, frames, or partial frames can or should be used to perform the Center's photointerpretation mission will remain until further study has produced more definitive conclusions with respect to the mix of collection systems we will be working with in the [redacted] 25X1A

II. Conclusions and Recommendations

A. Conclusions

1. Exploitation

a. Given the Center's present organization, procedures and reporting responsibilities, 65 percent of the PI mission exploitation effort is expended by components which have a fundamental requirement for roll film. Anything less is insufficient, anything more is duplicative. Thus, any significant improvement resulting from pre-cutting mission film would be limited to the other 35 percent of the PI mission exploitation task. Of that 35 percent, about 10 percent requires full frames but not chips. Even in the remaining 25 percent, however, not all of the known targets can be reduced categorically to one size--although about 3,000 of them (including over 2,000 SAM sites) can be reduced to [redacted] pre-processed chips. 25X1D

b. Chipping by the photointerpreter is, in essence, no different than an all-source analyst cutting paragraphs out of a [redacted] report and pasting them on index cards for future reference. It is a normal part of the routine associated with being a PI and is not an anomaly that can be automatically exploited to any significant extent by decree. Under the existing system in the Center, when a photointerpreter cuts a chip, he does so after he has scanned the surrounding area for intelligence information. Thus, chips are cut after the fact! By giving the interpreter a pre-processed chip or anything less than all the available coverage, there is a risk of missing intelligence information. 25X1A 25X1

c. Under current practices for exploiting the [redacted] 25X1D chips are most useful in the following descending order of importance: third-phase, first-phase, and second-phase readout. No independent third-phase requirement for pre-processed chips exists, however, because the photolab now satisfies some of this requirement and chips cut from work copies of roll film satisfy the remainder. The first- and second-phase requirements for chips are almost always met by cutting the work copies of roll film.

d. Based on the way we handle satellite missions now, we believe 25X1D that the Center can exploit [redacted] missions without resorting to pre-processed chips or pre-cut film. This conclusion is based on the assumption that the Center will be provided with adequate copies (4 to 5 duplicate positives and one duplicate negative) of [redacted] roll film. 25X1D

2. Storage, Retrieval, and Distribution

a. By continuing our present policies concerning the retention 25X1D and destruction of film into the [redacted] era, our first floor storage space will begin to reach its capacity by the end of FY-1972. Steps are, however, now being taken to improve the utility of our existing film library space.

b. Because the film library now must keep two copies of the film to service the post-mission requirements of IEG, TSSG, IAS, and other components, and must retain the original negative to satisfy post-mission reproduction requirements and evaluation, the creation of a central file of cut film is at a minimum additive. In addition, no valid requirement for the establishment of a central file of cut-film holdings now exists because the PI maintains his own file.

25X1

c. Distribution service by the film library to its customers is very good; retrieval by the film library from its customers can be improved without serious difficulty. Cut-film is not likely to aid either of these functions.

d. The distribution of film to photointerpreters within components can be improved. Some components are more efficient at this function than others. Cross-fertilization of the different distribution methods could provide fruitful improvements to all. Even here, however, the number of conflicts on the [redacted] and the number we estimate on the [redacted] are not serious enough to warrant a major change in the way we do our business.

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25X1D

3. Production and Reproduction

a. The Center's roll film needs will be within the processing contractor's capability throughout the [redacted] 25X1A

b. The Center's existing reproduction facilities are adequate for continuing our effectiveness in the foreseeable future. These facilities are geared to handle roll film, although cut film can be accommodated.

c. The quality of reproductions that the Center makes from the original negative now exceeds the quality of the duplicative positive of the mission film provided by the contractor.

B. Recommendations

1. The Center should inform the NRO that the following are our film requirements for exploiting the [redacted]

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a. For photointerpretation purposes:

As a minimum, three copies of DP roll film, packed 130 feet to a can, two of which can be cut and the third roll copy to be used to satisfy the film library requirement.

IEG would prefer: (1) Same as the minimum with the addition of multiple copies of frames of high-density target areas. These frames would be considered equivalent to a work copy film and can be cut; (2) Three work copies, which can be cut at the discretion of the photointerpreters, and one file copy which will satisfy the film library's post-mission requirements. All film packed 130 feet to a can; (3) Same as the minimum with the addition of minimum-size chips, partial frames, or frames (as applicable) of the 50 to 100 highest priority targets.

b. For photogrammetry and film evaluation purposes:

One duplicate positive of each mission packed 400 feet to a can. This copy will satisfy one-half of the film library's file requirements after the mission has been exploited and evaluated.

c. For reproduction purposes:

One duplicate negative of each mission, which will be held until the original negative becomes available, packed 400 feet to a can.

2. The Center should inform the NRO that there is at present no estimated need for [redacted] pre-processed chips or cut film (unless the Center's top management opts for a.(1) or a.(2) above) 25X1D

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from the film processing site for first- or second-phase targets. At the same time, however, the Center should indicate its support for R&D with regard to chips and inform the NRO that should the Center establish a valid need for chips at a later date, we will provide our specifications and requirements at that time.

3. The Center should continue to recommend to COMIREX that the OAK be streamlined and reduced to the 50 to 100 most important targets. Thus, decrease will automatically reduce film conflicts in IEC.

4. The Center should continue the development of flexible equipment such as the 1540 light table and Mod II rhomboids that serve most of the interpreter's needs for oncoming and existing systems.

5. The Center should not institute any central file for pre-processed chips or cut film because the primary requirement for such a file is not present in our situation.

6. The Center should allow the present method of obtaining and storing chips to continue as is for the foreseeable future.

III. Exploitation

During this study, an attempt was made to relate current chipping practices, the mission exploitation effort expended by the various components, film needs and target types, and the relative advantages of various film configurations in each phase of the exploitation process within each major component.

A. Current Chipping Practices

In exploring the relative advantages and disadvantages of pre-cut film, and particularly pre-processed chips, the questions of what can be cut (technical feasibility) and what should be cut (given organizational exploitation assignments and our primary intelligence function) are continuously intermingled.

For this reason, the Center is faced with the dilemma of categorizing and re-categorizing targets according to which question is being answered. For example, an airfield can be covered adequately by a small piece of imagery, produced at the processing site. The answer to the question of technical feasibility is "yes". However, that airfield is readout during second-phase exploitation as part of a geographic area. The answer to whether the target should be cut out is "no", since once the geographic area coverage is provided to the interpreter, he has already received adequate coverage of that

airfield. A similar instance occurs with high-priority ICBM targets. An ICBM site is currently a 1C target within an ICBM Complex, which is a 1A target. Once the interpreter receives the available coverage of the complex, he has already received all of the film he needs. Again, the site can be cut to a designated size; but there is no need for doing it.

An interesting explanation of the practice of chipping was prepared by IAS in the preparation of its five-year plan. "It must be understood that what is involved is not merely a mechanical process of cutting and filing. The time includes the time it takes an analyst to locate the targets of interest, examine the targets and surrounding areas, see if anything significant has appeared or changed, and decide what to chip". Photointerpreters are knowledgeable on a continuing basis about the general status of most known targets before the arrival of a mission and this is a factor determining whether or not chips are cut. Acquired knowledge and the target specialty of a photointerpreter enable him in most cases to look for specific indicators of a meaningful change in target status. This skill generally determines the amount of time required to report target status adequately and whether or not stereo coverage of the target is required to satisfy the readout requirements. However, in the two chip experiments, the pre-processed chips increased the amount of stereo readout and even at [redacted] scale permitted a large proportion of the detailed readout requirements to be satisfied.*

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Two observations based on these two experiments indicated that a chip system has as its prerequisites: (1) a target-delineation program and (2) a revision of the requirements specifically for a chip system.

In IEG, chips are currently used, in the following order of importance:

(1) Third-Phase
(2) First-Phase
(3) Second-Phase

25X1D During a recent [redacted] mission, the following three practices were observed during the first- and second-phase readout:

(1) Photointerpreters cutting chips in pairs for stereo readout;

(2) Photointerpreters cutting single chips (sometimes of NAC targets) for historical file purposes; and

(3) Photointerpreters who cut no chips at all.

Equipment is available or will be available within the next two years that enables stereo viewing of roll film without the current difficulty, this indicating that chipping for the stereo readout reason may decrease.

* Refer to "Pre-processed Chip Evaluation Reports", September 1968 and April 1969.

B. Mission Exploitation Effort

Any improvement in efficiency must be geared to the organization in which the improved methods will be used. The following table relates the percent of total first- and second-phase exploitation photointerpreter man-hours expended by IEG during the first-half 25X1A [redacted], as well as the percentage distribution of our other major exploitation tasks.

TABLE I

Photointerpreter Effort Devoted To
Major Exploitation Tasks in First-Half
FY-1969 (Percent)

25X1D [redacted]

Expected benefits from changing our film configuration depend on this division of effort and the differing requirements of the organizations that perform the first- and second-phase exploitation.

The man-hours underlying the percentages in Table I were derived from MIS data and are useful for broad planning work. They should not be confused with the figures obtained in the data collection efforts described later for two reasons:

(1) The MIS, as it is currently structured and used, does not store detail in the proper form for the micro-analysis needed to estimate the effects of procedural changes.

(2) The data collected in a specific form for a specific purpose ignores some of the complementary tasks that a man performs (which are necessarily included in MIS data).

C. Component Film Requirements

25X1A 1. [redacted] -- This Division expends between 40 and 43 percent of the total satellite-mission first- and second-phase 25X1A exploitation effort. [redacted] reads out second-phase "point" targets while searching through the film for new targets in its geographic areas. Since roll film is needed to perform its search responsibility, chips of the thousands of point targets within [redacted] geographic area are 25X1A duplicative and would have to be furnished in addition to roll film. This division performs specific searches (such as a SAM Search) as well as the general search.

25X1A 2. [redacted] - This Division expends between 22 and 23 percent of the total satellite-mission first- and second-phase exploitation effort. Like [redacted] this Division reads out 25X1A its second-phase targets while searching for new targets. Since roll film is needed to perform its search responsibility, chips of point targets are duplicative and would have to be furnished to [redacted] in addition 25X1A to roll film. This division performs several specific searches (e.g., new SAM's) as well as the general search.

3. [redacted] Division 25X1A
contributes 21 to 26 percent of the total satellite-mission first- and second-phase exploitation photointerpreter effort. The needs of this division are different from branch to branch and section to section. However, to read out ICBM Complexes, all 1A targets, complete coverage is required -- that is, either rolls or roll frames. Since the 1C targets are within the 1A complexes, chips of the 1C targets are duplicative. MR/IRBM's are somewhat different; there are approximately 413 MR/IRBM targets that experience dictates can be read out adequately 25X1D
from a [redacted] pre-processed chip. The [redacted] 25X1D
25X1D [redacted] was mentioned by photointerpreter management and supervisory personnel as being large enough to read out the listed
25X1D targets adequately for the [redacted] In the Defensive Missiles Branch, slightly over 2,100 point defensive-missile targets can be read out from
25X1D [redacted] chips. However, many of the 2,100 targets are not in the active COMIREX collection deck, but are contained in the 27,000 targets that NPIC exploits if and when they are collected. These targets are currently read out and chipped (when considered necessary) in an indexing-type operation. Nevertheless, all of [redacted] targets can 25X1A
not be read out using chips.

One-third of the [redacted] first- and second-phase 25X1A
mission exploitation effort (6-9 percent of the total) is expended by the
25X1A [redacted]; the remaining two-thirds (15-17 percent of the total) is expended by the [redacted]. Thus, in this 25X1A

[redacted] 25X1

[redacted] 25X1

Division, which has a large mission exploitation input, the targets suitable for chipping are primarily well-established lower-priority targets. Most high-priority targets are not amenable to chipping.

25X1A 4. [redacted] -- The Scientific Division expends 11 to 14 percent of the mission exploitation photointerpretation effort.

25X1A [redacted] have 466 targets and 285 targets, respectively, that can be read out adequately from 6x6 chips; the remainder of their targets require more extensive coverage for exploitation.

25X1A The [redacted] has relatively few first-priority targets 25X1A

25X1D and, on [redacted] which was analyzed in detail, the [redacted]

25X1A [redacted] had between 1/3 and 1/2 as many targets as each of the Geographic Divisions.

5. Summary

In summary, it appears that 65 percent of our PI mission exploitation effort is expended by components with an overriding need for roll film and will continue to require this configuration because of the nature of the work. Another 10-20 percent of our work requires frames, though probably not the extreme frame size on the [redacted] in all 25X1D cases, and most of the remaining 15-25 percent of our effort can be accomplished using 6x6 inch chips.

D. Third-Phase Requirement for Pre-Processed Chips or Cut Film

At present, there is no independent third-phase requirement for pre-processed chips and/or cut film.

Chips for use in third-phase exploitation are obtained in one of two places:

(1) Directly from work copy mission film,

(2) From frames reproduced by the Photolab.

In addition, much of the Center's third-phase Direct Support work is accomplished using roll film, particularly in negating targets.

It should be noted that, when the original negative is used, the reproductions obtained from the photolab are equal to or better than the quality of the roll film obtained from the processing site. The turnaround time from the photolab ranges from one hour to three days, according to the priority of the request. The reproductions from the processing site are production line materials and are not as high in quality as those produced in the photolab.

Assuming that at least one work copy of the film will be available for chipping in the [redacted] and since the photolab can, as a bare minimum, provide equivalent frames for chipping with adequate response time, there will be no independent third-phase requirement for pre-processed chips. 25X1A

Referring to Table I, it can be seen that those Divisions bearing most of the third-phase responsibilities are at the same time bearing less of the first- and second-phase mission exploitation responsibilities.

E. First- and Second-Phase Requirement for Pre-Processed Chips or Cut Film

Any first- and/or second-phase requirement for pre-processed chips and/or cut film in NPIC derives from the ability of these two film

configurations to furnish the interpreter what he needs to do his job when he needs it.

a. First-Phase

First-Phase exploitation, the readout of high-priority targets, can be expected to continue throughout the [redacted] 25X1A
25X1A [redacted] simply because the intelligence needs of the community are sometimes time-dominated (the Czechoslovak crisis, for example). This is not to say that the number and types of targets that we now exploit in first-phase should not or will not change.

Present experience indicates that we are effective in satisfying our first-phase responsibilities to the community. Effective, in this sense, means that we have regularly demonstrated the ability to accomplish our task -- reading out specified targets and areas in a given time frame. Although the time frame is much longer and the number of targets much greater, the same can be said for the second-phase.

At present, conflicts for film occur during both first- and second-phase readout. Conflict is defined as the lack of the necessary film when the photointerpreter is ready to read that target out. The time lost due to conflicts occurring during the first-phase exploitation of the [redacted] recorded during 25X1D
25X1D during Mission [redacted] and believed to be typical, accounts for about five percent of the actual readout time (not MIS time). 25X1

It should be noted that an individual conflict would have to be very long (more than one day) to be capable of delaying the OAK. Likewise, the number of conflicts and the time lost because of them is relatively small for the second-phase of [redacted] 25X1D mission exploitation.

No direct measure of the number of conflicts to be 25X1D encountered with the [redacted] is obviously possible at this time. Unfortunately, no direct measure of [redacted] conflicts is available 25X1D either, though a collection effort to rectify this shortcoming may be conducted in the future. To enable a projection for the 25X1D [redacted] to be made, the relative difference between the [redacted] and 25X1D was an obvious link to obtain a "feel" for the magnitude and number of conflicts. The managers of the operating components were queried on the relative difference between the conflicts and resulting delays between the [redacted] and the 25X1D 25X1D [redacted] No major difference was felt to exist.

This indirect method, then, was used to project the conflicts 25X1D and resulting delays of the [redacted] This is explained more fully in the estimate of benefits given for each system in Section VI.

b. Second-Phase

During the second-phase exploitation of [redacted] delays occur. 25X1D These delays account for about seven percent of the actual readout time (not MIS time) and occur because: (1) Needed film

is being used for an OAK target or (2) it is being used for a Supplement target, or (3) the film available is not a work copy. The overall effect is not itself large, especially since the supplement is not a time-dominated effort, is spaced over several days, and is worked on by many interpreters.

Using the same indirect method previously described, an estimate of the delays that will be experienced in second-phase exploitation of the [redacted] has been formulated; this estimate is also given in Section VI.

25X1D

IV. Storage, Retrieval, and Distribution

A. Storage

storage problem with respect to first floor vault space. The models constructed, one by [redacted] 25X1 indicate that by early to mid-1972, the Center will have reached its storage capacity. However, an investigation aimed at using our space more efficiently is now being conducted by PSG and the Records Management Officer and a reasonable solution is within the Center's grasp at present.

Since the Center will be storing two copies of DP film to service post-mission requests for roll film and the ON to continue to make reproductions, chip or frame storage will be additive.

The storage of chips in analysts files is not now and will not become a problem. The storage of chips in a central file, assuming a requirement for such, is subject to the same problems associated with any large storage and retrieval system. However, since the existing chip files service primarily the individual compiling them and, in some cases, another IEG photointerpreter, the prime requirement for a centralized library-type system -- many borrowers of the same items -- is not present. By instituting a centralized storage and retrieval system for exploitation chips, we will construct a system capable of solving a library problem that NPIC does not have.

At present, our photolab is geared to solve any need for duplicate imagery that exists by reproducing a copy of the area needed by the two or more photointerpreters in a short period of time (refer to Section V).

B. Retrieval

Film retrieval by photointerpreters from the film library is not a problem at present. However, film retrieval by the film library from the photointerpreters is a problem worthy of consideration. A detailed study of the retrieval and service patterns is now being reviewed in order to improve the efficiency of this aspect of our current system.

Two aspects of the retrieval function, which are sometimes intermingled, are accountability and security.

(1) Accountability is essentially a management problem, the solution to which may perhaps be facilitated by some degree of automation. If, as suggested in Section VI and as recommended in Section II, the rolls of film are packed in two different ways for two different purposes, a subsequent change in the film control numbering system would be required.

(2) Security is not a problem at present in as much as our chip holdings exist in the form of unreceipted working papers, comparable in essence to the working papers in the files of the all-source analyst. To introduce cut-film holdings formally would at least require a receiving and accounting function, which could perhaps be automated. However, since there is no library retrieval function to be performed, the additional security control problem that might be constructed should be considered as a cost of changing our operation to include pre-processed chips or frames.

C. Distribution

The distribution of film is handled fairly efficiently by IEG; if justified, this process could be further automated. Distribution of mission film from PSG/IRB to IEG accounts for a very small percentage of mission exploitation time; some improvement could perhaps be made here also, but the gain would be marginal. There is reason to doubt that distribution of a large number of pre-processed chips along with some roll film would significantly reduce distribution time.

The intra-Division distribution process was examined in detail on
25X1D Mission [redacted] the efficiency of this operation is good and can be improved by procedural changes.

V. Production and Reproduction

NPIC can now reproduce film that is of better quality than the mission DP if the original negative is used. If the duplicate negative is used, the quality of reproductions is of poorer quality than the material received from the processing site; however, the practical implications of this quality difference have not been measured. NPIC cannot compete with the processing site, however, in mass producing copies. Our current response time in the photolab varies from one hour to three days, depending upon the product required (DP's, DN's, density cuts, contact prints, enlargements, etc.) and the urgency or priority the requester assigns to the requirement when submitting it to the photolab. The response time is not expected to increase if the level of requests remain at about its current level. At present, there is no indication that the requirements levied on the Center's photolab will change.

NPIC responds on a daily basis to external organizations requesting reproduction. During calendar year 1968, the Center fulfilled requests for 1,892 photos, duplicate positives, or photo enlargements. The customer organizations and their requests for service were: IAS, 1,486; DIA, 102; SAFSS, 226; and NSA, 15. In addition, IAS made one request during the year for a roll reproduction consisting of 292 continuous frames. NPIC

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will continue to service requests from the community utilizing DN (or ON when available) roll film as is currently the practice. Our current equipment in the photolab is primarily geared to reproduction from rolls although cut-film can be used.

There is a qualitative advantage to producing or reproducing individual pieces of film. This occurs because the exposure can be controlled for each piece whereas, in roll production, an average exposure is used. At the Center, the various gradations and exposure levels can be obtained on the single frames reproduced for individual requests.

The primary processing facility is currently equipped for mass-production of rolls, not for small job-lots of cut-film. The primary processor does not, at present, have, nor has it definitely programmed, any methods or equipment for mass-production of cut-film.

The capabilities of the breakdown team are limited in the number of targets that can be selected and printed as pre-processed chips at the present time. Quantities of about 50 targets have been proven feasible on the two chip experiments and up to 100 targets may be feasible. However, above this level target selection for pre-processed chips or frames must be automated.

The [redacted] system is expected to 25X1D be accurate enough to enable a target to be located automatically by a computer on the film. Thus, one of the most important ingredients that would be necessary in automating the target selection and production of pre-processed chips will probably be a fact with the [redacted] 25X1D 25X1

VI. Estimated Benefits

A. General

The benefits explained and calculated in this section represent an estimate of the increase in efficiency that can be obtained by adopting pre-processed chips and/or cut film in IEG.

The benefit calculations are based on direct measures for the [ ] 25X1D logical assumptions and previous experience concerning the link between 25X1D the [ ] and a reasonable approach to estimating the [ ] 25X1D 25X1D effect. [ ] data was derived from [ ] Task Force reports where possi- 25X1D ble. MIS data have not been used for purposes of this estimate simply because of the number of assumptions that must be drawn concerning the time spent by photointerpreters doing tasks other than photointerpretation.

All benefits are expected to accrue from avoiding conflicts (and the resultant delays) and saving that increment of a photointerpreter's time spent cutting and labeling chips that he could be expected to cut during mission exploitation if no change is made. No estimate is included for mounting and rolling through roll film although it can be easily demonstrated that a photointerpreter can mount and reel through a normal roll 25X1D of [ ] photography in less than one minute. This cranking time will be decreased even further with the introduction of motorized split format light tables.

The fact that chips are also cut in slack periods and from frames of photography ordered from the photolab has also been ignored for two reasons: (1) no accurate measure of this activity exists and (2) most if not all of this activity will continue to exist anyway and cannot be considered a saving from conflict-avoidance and cutting time expended during the OAK and OAK Supplement efforts.

Since some photointerpreter management and supervisory personnel have indicated the desire for a 6x6 inch pre-processed chip, if one is to be provided, and since this pre-processed chip would, after the fact, contain excessive ground cover and be incompatible with existing chip files, then it can reasonably be expected that interpreters will chip the pre-processed chip, thereby negating most of the saving that would accrue from not having the photointerpreter cut his own chips in the first place. Nevertheless, this offsetting factor has been omitted from the calculations, but it should be realized that this omission drives the calculations toward a "best-case" estimate.

There are several possibilities that cannot be reduced explicitly to quantitative terms both for or against any pre-processed chip or cut-film system.

1. If something less than a frame of photography is supplied and intelligence information is missed and later is found to have been contained on the frame, the uncertainty of missing intelligence may subsequently drive the photointerpreter back to roll film to

25X1

confirm his readout, which would still exist but in fewer copies, thereby re-introducing the conflict problem.

2. The existence of an organization and methods of operation, however informal, is much more easily improved to achieve a real net benefit than overhauled to achieve an anticipated benefit that may be evident only after the revised system has been in existence for a period of time.

3. The fact that [redacted] coverage will have been 25X1D
25X1D obtained by the [redacted] for most, if not all, of the existing targets may reduce the practice of cutting chips below that anticipated for
25X1D the [redacted] since better quality photography is obtained by the [redacted] 25X1D
This is probably most applicable to the Geographic Divisions.

B. Summary of Benefits

The benefits (savings) that we could hope to accrue in the mission exploitation time frame, apart from all other photointerpretation tasks are presented in Table II. As in most analyses of future benefits, averages and assumptions attempt to overcome uncertainty, but never do.

The OAK conflicts and the time expected to be lost on the [redacted] be- 25X1D
cause of conflicts caused by roll film does not appear great enough to warrant even adding one man to the breakdown team to assist in manufac-
25X1D turing pre-processed cut-film for the [redacted] system. However, conflicts can definitely be reduced by some procedural changes. We now have enough

TABLE II

Summary of Annual Photointerpreter Time Savings

25X1D [redacted]

Copies	OAK Conflict Hours	OAK Chip Hours	Supplement Conflict Hours	Supplement Chip/Hours Mono	Supplement Chip/Hours Stereo	Savings (Man-Hours) Mono	Savings (Man-Hours) Stereo	Savings (Man-Years) Mono	Savings (Man-Years) Stereo
1	521	300	3,050	4,050	8,100	7,921	11,971	4.6	7.0
2	263	300	1,525	4,050	8,100	6,138	10,188	3.6	6.0
3	172	300	1,019	4,050	8,100	5,541	9,591	3.2	5.6
4	131	300	763	4,050	8,100	5,244	9,294	3.1	5.4
1	172	300	992	4,050	8,100	5,514	9,564	3.2	5.6
2	86	300	496	4,050	8,100	4,932	8,982	2.9	5.3
3	59	300	331	4,050	8,100	4,740	8,790	2.8	5.2
4	45	300	251	4,050	8,100	4,646	8,696	2.7	5.1
4	68	150	400	333		951		.6	

25X1D [redacted]

* 1,700 Man-Hours = One Man-Year

25X1 [redacted] 25X1

film to satisfy our photointerpretation, photogrammetry, film evaluation, and film library responsibilities.

The various savings that could accrue from chipping the [redacted] during the mission exploitation could result in a saving of from four to six man-years. 25X1D

What are the factors that would reduce this gross savings?

1. If, as suggested earlier, the photointerpreters cut the pre-processed chips to reduce them to a size compatible with the informal chip files that he will still be keeping current with new [redacted] material during the [redacted] period, the projected gross savings of four to six man-years would be reduced by the amount of re-cutting done. If all of the pre-processed chips were re-cut, our net savings would be reduced by one-half to one-third of the gross savings or two to three men. 25X1D 25X1A

2. If each piece of cut-film imagery must receive the same security controls as a roll of film now does, there would be no great difficulty in accommodating a quantity of cut-film approximating the current OAK in number of targets, but we are at present completely unequipped to control thousands of pieces of cut-film per mission. Thus, the gross savings in photointerpreter time would be matched to some extent by additional control work. If this required one more person, our gross savings shrink again.

3. If another man is assigned to the breakdown team for the 72-hours preceding mission exploitation in order to select and monitor

the production of cut-film or chips, then we are trading the time of the additional member of the breakdown team against the time saved by photointerpreters. The net result would at best be small and would be spread among so many interpreters that any effect on the exploitation process may not be measurable or even noticeable.

4. If the number of targets to be selectively printed either in partial frames or standard-size chips is large (above about 100), the selection system must be automated. Although NPIC would not be responsible for the programming effort and developing the labeling equipment, the gross benefits derivable within NPIC do not seem to warrant this sophisticated approach.

5. If the entire selection and printing of standard- or variable-size pieces of cut-film were automated and the number of roll copies reduced correspondingly and then intelligence information was missed because the film was cut, the effect of uncertainty would drive the interpreter back to the roll film. Since fewer copies would then be available, the number of conflicts would increase disproportionately (Tables III and IV).

25X1D [redacted] 25X1A 25X1

25X1D

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